



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,680	10/22/2003	Masayuki Motonari	244104US0X CONT	4922
22850	7590	06/21/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			TRAN, BINH X	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 06/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/689,680	Applicant(s) MOTONARI ET AL.	
	Examiner Binh X. Tran	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26,27 and 30-36 is/are rejected.
- 7) ☒ Claim(s) 28 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 26, 30, 32, 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ronay (US 5,876,490) in view of Robinson et al. (US 5,990,012).

Respect to claim 26, Ronay discloses a chemical mechanical polishing method comprising the step of polishing an interlayer insulating film (col. 6 lines 49-60) using an aqueous dispersion which comprises a scratch inhibitor (i.e. surfactant, col. 8 lines 5-20) and an abrasive comprises organic/inorganic composite particle comprises an organic particle (i.e. polymer coated particle) and inorganic particle (i.e. uncoated particles) (See

Art Unit: 1765

col. 3 lines 30 to col. 4 lines 25). Ronay further discloses that the polyions (i.e. polymer) are highly attracted to the surface of the abrasive particles (inorganic particle) (col. 3 lines 35-48, col. 4 lines 55-64). This would reads on the limitation zeta potentials of opposite signs bonded by electrostatic force.

Ronay fails to disclose that the insulating film has an elastic modulus of no greater than 20 GPa. In a polishing process, Robinson teaches to polish insulating film compose of polymer material selected from the group consisting of polyethylene, polyvinyl and polyimide (col. 6 line 54-59, col. 10 lines 5-9). Elastic modulus is a property of material itself. The specific method to measure a property of a material (i.e. elastic modulus) will not have any patentable weight and will not result a change to the material itself. According to 2112.01, "Products of identical chemical composition can not have mutually exclusive properties. A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. It is known in the art that the elastic modulus (aka Young's modulus) of polyimides is 3-5 GPA and polyethylene is 0.2-0.7 GPA (See prior art made of record).

It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Ronay in view of Robinson by polishing polymer insulating material because the hydrophobicity of the polymers can be overcome by lower the surface tension of the polishing solution.

Respect to claim 30, Ronay discloses the aqueous dispersion further comprises an oxidant (read on "oxidizing agent", col. 7 lines 55-58, col. 8 lines 50-53). Respect to

Art Unit: 1765

claim 32, Ronay discloses the aqueous dispersion further comprises an organic acid (col. 5-6). Respect to claim 34, Ronay discloses the abrasive is present in the amount of 1 wt% (col. 8 lines 49-52, within applicant's range). Respect to claim 35, Ronay discloses the pH between 9-11 (col. 6 lines 38-39, within applicant's range).

4. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ronay and Robinson as applied to claim 27 above, and further in view of Matsuzawa et al. (US 6,420,269).

Respect to claim 27, Ronay teaches to use non-ionic surfactant (col. 8 lines 19-20). However, Ronay fails to disclose the specific non-ionic surfactant. In a polishing method, Matsuzawa teaches to use non-ionic surfactant including polyoxyethylene lauryl ether (read on "polyoxyethylene alkyl ether", col. 10 lines 66-67). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Ronay and Robinson in view of Matsuzawa by using polyoxyethylene lauryl ether because equivalent and substitution of one for the other would produce an expected result.

5. Claims 31, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ronay and Robinson as applied to claim 30 above, and further in view of Mahulikar (US 6,447,563).

Respect to claim 31, Ronay fails to disclose the oxidizing agent is hydrogen peroxide. However, Ronay clearly discloses the oxidizing agent is ferric nitrate (col. 10 lines 23-24). In a polishing method, Mahulikar teaches to use either ferric nitrate or hydrogen peroxide (col. 4 lines 11-20). It would have been obvious to one having

Art Unit: 1765

ordinary skill in the art, at the time of invention, to modify Ronay in view of Mahulikar by using hydrogen peroxide as an oxidizing agent because equivalent and substitution of one for the other would produce an expected result.

Respect to claim 36, Ronay fails to disclose the specific weight percent of oxidizing agent. Mahulikar teaches the percentage of oxidizing is a result effective variable. Mahulikar further discloses the oxidizing agent is present is an amount of 0.1 to 5% (col. 4 lines 18-20, within applicant's range). The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention to perform routine experiment to obtain optimal percentage of oxidizing agent.

6. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ronay and Robinson as applied to claim 26 above, and further in view of Kaufman et al. (US 6,217,416).

Respect to claim 33, Ronay teaches to use scratch inhibitor including surfactant at 0.1 to 2% (col. 8 lines 15-20). However, Ronay fails to use another scratch inhibitor other than surfactant. In a polishing method, Kaufman teaches to use scratch inhibitor includes thiourea and surfactant. Kaufman further discloses the concentration of thiourea ranges from 0.01-0.1 wt % (col. 6 lines 30-45) and surfactant concentration ranges from 0.001 to 0.1-wt% (col. 6 line 59 to col. 7 line 5, within applicant's range). It would have been obvious to one having ordinary skill in the art, at the time of invention,

Art Unit: 1765

to modify Ronay and Robinson in view of Kaufman by using scratch inhibitor including surfactant and thiourea within the suggested weight percentage because it helps to stabilize the dispersion and preventing wet etching of the substrate surface.

Allowable Subject Matter

7. Claims 28-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: The reason for allowance was discussed in previous office action.

Response to Arguments

9. Applicant's arguments with respect to claims 26-36 with respect to the filing date of Zhang have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Elastic Modulus, <http://www.mse.cornell.edu/courses/engri111/modulus.htm> ;
Cornell University 1996 discloses the elastic modulus of polyimides in the ranges of 3-5 GPA .

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

Art Unit: 1765

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Binh X. Tran

Binh X. Tran